

VII.—NOTE ON THE SYDNEY COAL FIELD.—BY E. GILPIN,  
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In this note it is proposed to draw attention to the presence in the Sydney coal field of a subordinate basin. The existence of the basin was indicated by the officers of the Geological Survey in their reports, but its extent has been more clearly defined by recent explorations. The survey of Mr. Fletcher showed that a line of fault runs from Sydney to the Mira River, near the mouth of Black Brook. More recent examinations have shown that this fault diminishes in extent as it is followed to the south. At the town of Sydney it brings up measures referred to the carboniferous limestone, and the section as exposed is probably directly connected with the rocks of the same horizon on the west side of the Sydney River. At this point the denudation of the uplifted measures has exposed these strata. As the distance from the point of maximum upheaval increased the limestone series was covered by a gradually increasing thickness of millstone grit until in the trough lying against the line of fault measures appear belonging probably to the top of the millstone grit or the lower part of the productive measures.

When the line of the fault reaches the MacPherson road it appears to have become much reduced in extent. Beyond this its passage is shown on the Morrison road by springs and rough ground. It may be inferred that its line here lies a little to the eastward of that marked in the geological survey plan. It is not known if it is a dislocation in this vicinity or only an anticlinal.

The Cossitt basin lies to the south-west of this fault. Along the eastern side of the line of fault the measures, wherever noted, have a low and regular dip to the north-east, and agree with those observed in the Glace Bay district. On the west side of the fault the dips are to the south-west at heavy angles, and on approaching within a mile of the town of Sydney the line of steep dip turns in a semicircle round to the west, limiting the

coal basin in this direction, and between this line of outcrop and Sydney is an interval of disturbed strata. From the line of fault to the centre of the Cossitt basin at the synclinal the distance varies, but may be roughly estimated at about one mile. The dips over this interval decrease from  $46^{\circ}$  to  $20^{\circ}$ , and shortly before the synclinal is reached three seams have been exposed dipping to the south-west at an angle of  $30^{\circ}$ , and yielding the following section :—

	Feet.	Inches.
Coal .....	2	0
Strata.....	100	0
Coal .....	2	0
Strata.....	20	0
Coal .....	2	0

About three-quarters of a mile further to the south-west are met the LeCras seams, dipping the reverse way, or to the north-east, at an angle of  $7^{\circ}$ . Here the following section has been proved :—

	Feet.	Inches.
Coal .....	1	10
Strata.....	100	0 ?
Coal .....	2	2
Shale .....	0	8
Coal .....	0	2

This evidently corresponds with the seams found on the reverse dip and already alluded to. From this point the western outcrop of these seams runs in a south-easterly direction parallel to the Mira road and crossing the Morrison road a little to the east of its junction with the Mira road, and continuing until Black Brook is nearly reached. At this point the south-western side of the basin appears to be turning to the eastward, possibly showing that the end of the basin is reached, and that the strata are falling in with the normal dip of this part of the district which is a little to the east of north.

To the south of the Morrison road, nearly five miles from its junction with the Mira road, several outcrops of seams have been

opened dipping at an angle of about  $20^{\circ}$  nearly east. The course of these seams, allowing for the presence of the fault as an anticlinal, may bring them into range with the continuation of the LeCras seam, in which case the seams of the east side of the Cossitt Basin would curve round to the eastward at McPherson's road and become conformable with the measures underlying the Glace Bay coal seams. If, however, the fault be present in any magnitude then these seams would continue in a north-westerly course along the east side of the fault, leaving the seams in the Cossitt Basin isolated. The increase in dip of the Murray seams over the normal dips hitherto observed in this vicinity may be due to an anticlinal character here of the fault already described, which may be found to pass a short distance to the south-west of these seams.

One of the problems of this coal field is the Tracey seam. This bed of coal occurs very low down in the measures, many feet below any seam hitherto worked. It is known only at False Bay between the head of Cow Bay and Mira Bay. Here, emerging from the Atlantic, after a land course of about one mile it is lost again in the False Bay Lake. Here it was opened and worked a number of years ago, and is said to be of fair quality. The extension of the outcrop of this seam into the district lying between Cow Bay and Sydney has been the dream of many a prospector, and has led to an expenditure of much money, producing only negative evidence. The theoretical production of its outcrop, as laid down by Sir William Dawson, the Geological Survey and others, would bring it not far from the Murray seams. The subject, while interesting geologically, is not without a practical value, for owing to the prevailing low dips, the seam would be accessible over a wide expanse of country if it preserves a size admitting of economic mining.

The identification of the Tracey seam with the Murray seams and their further identification with those of the Cossitt Basin will prove an interesting subject.

There is another point of interest in connection with the Cossitt coal field. A collection of fossils from one of the openings on the LeCras seams was submitted to Sir William Dawson

who remarked, "that it was composed principally of leaves pressed in grey shales and remarkable for furnishing several species of ferns with the fructification. The horizon is stated to be that of the millstone grit, but the determination of the plants would not convey that impression, being of species not occurring elsewhere except in the coal formation, and even in the upper part" He further remarked that a similar group of plants appears in a collection made at Henderson's pit on Black Brook, about four miles to the south-east near the point already alluded to as the turn of these measures at the end of the synclinal. The occurrence of a well marked group of fossils characteristic of the productive measures in this isolated position, surrounded by miles of *strata* of millstone grit age, and separated from the nearest known productive coal measures by a distance of several miles, appears at first sight unaccountable. When, however, the effect of the fault already described is considered, it appears probable that in this area the millstone grit supports a narrow trough of higher strata. At present it is impossible to correlate the beds already exposed with any of those known in the Glace Bay district.

Considering the subject from the point of view expressed by Sir William Dawson, that the fossils are characteristic of the upper portion of the productive coal measures, it is difficult to believe that the lower portion of the horizon can be presented in the Cossitt Basins with the equivalents of the seams now being worked at Glace Bay; and the hypothesis may be hazarded that at this point the deposition of the later members of the strata, comprising the productive measures, took place over rocks of millstone grit age without the intervention of the middle and lower portions of the productive measures.

Putting aside the fossil evidence it may be remarked that the sections exposed so far in the Cossitt Basin recall the series of small seams associated with the Martin seam near Bridgeport. It may, however, on further exploration be found that the Murray seams passing to the east of the Sydney fault out-crop along the range of the Fitzpatrick seam and coincide with the Cossitt seams as they are brought up on the opposite or west side of the fault.